

U.S. Patent Application Serial No. 10/566,719
Response filed August 18, 2008
Reply to OA dated June 18, 2008

REMARKS

Claims 1-17 are pending in this application. In the proposed amendment, claim 3 is canceled without prejudice or disclaimer, claim 1 is amended and claims 18-20 are newly added. Upon entry of this amendment, claims 1, 2 and 4-20 will be pending. Entry of this amendment and reconsideration of the rejections are respectfully requested.

No new matter has been introduced by this Amendment. Support for the amendments to the claims is as follows:

Claim 1 has been amended to recite "the polyamine-based compound (A) is an aliphatic polyamine or an alicyclic polyamine." Support for this amendment may be found in original claim 3.

New Claim 18 is identical to original Claim 1. New claim 19, which depends from Claim 18, limits the value of "n" to be 1 to 3. This represents only a narrowing of the range in the base claim, and support for this amendment may also be found at page 11, lines 1-6. New claim 20 depends on claim 18, and limits the polyamine-based compound (A) to an aromatic polyamine, as supported by original claim 3.

Claims 1-17 are rejected under 35 U.S.C. §103(a) as being unpatentable over Haraguchi et al. (WO 03/037985) in view of Hanson et al. (US 2002/0168527). (Office action p. 2)

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Reconsideration of the rejection of pending claims 1, 2 and 3-17 is respectfully requested in view of the amendment to claim 1. As discussed above, claim 1 has been amended to limit the polyamine-based compound (A) to be an aliphatic polyamine or an alicyclic polyamine.

In the rejection, the Examiner refers to the disclosure in Hanson et al. of melamine borate in paragraph [0071], stating that melamine is a polyamine having three amino and three imino groups, and that this represents a disclosure of a polyamine borate meeting the limitations of claim 1. However, the polyamine of claim 1, as amended, does not read on the melamine borate of Hanson, since the melamine borate disclosed in Hanson is not an aliphatic polyamine or an alicyclic polyamine.

In claim 1, as amended, the polyamine borate is obtained from:

- (i) a polyamine-based compound (A) having at least one of an amino group and an imino group in the molecule, wherein the polyamine-based compound (A) is an aliphatic polyamine or an alicyclic polyamine, and
- (ii) a boric acid-based compound (B) represented by the following general formula (1).

Applicant submits that such a polyamine borate is not taught or suggested by either Haraguchi or Hanson.

The combination of Haraguchi with Hanson fails to teach or suggest the limitations of claim 1, and amended claim 1 and dependent claims 2 and 3-17 are therefore not obvious over Haraguchi or Hanson, taken separately or in combination.

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Regarding new claims 18 and 20

New claim 18 has the same content as the original Claim 1, and Applicant maintains that this scope is not obvious over the cited references.

"[0071]Additionally, the resin described in the present invention (see Example 3a for a specific case) may be formulated with other **flame-retardant materials** as co-additives with the compounds of the present invention to improve the performance. These co-FR materials could be either inorganic or organic and can be reactive or additive based compounds. Examples of inorganic additive type materials include, but not limited to, aluminum trihydrate (ATH), magnesium hydroxide, barium hydroxide, calcium carbonate, titanium dioxide, and silicon dioxide. Examples of organic based additives or reactives include, but not limited to, triphenyl phosphate, resorcinol bis(di-2,6-xylyl phosphate), 9,10-dihydro-9-oxa-10-phosphaphenanthrene-10-oxide, bisphenol A bis(diphenyl-phosphate), melamine, melamine phosphate, **melamine borate** and many others familiar to one skilled in the art." (emphasis added)

In traversing the rejection, Applicant maintains the previous argument that the effects disclosed for the present invention in the specification are unexpected over the cited art. The disclosure of melamine borate in Hanson is **only as a flame-retardant material**. Applicant had argued (Amendment of March 11, 2008, pages 11-12) that the combination of the present invention results in an **excellent high glass transition temperature** of the epoxy resin. This effect is clearly unexpected over the general disclosure of Hanson of melamine borate as a flame-retardant material.

The Examiner addresses this "unexpected results" argument on page 6, section (C), of the final Office action, stating that: "no evidence, such as a comparative example, is found in the originally filed specification using the closest prior art: the composition of the combination of

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Haraguchi et al. and Hanson et al., which is an epoxy resin having two or more epoxy groups and a melamine borate."

In response, Applicant notes that an "unexpected results" argument can be made in the form of a direct or indirect comparison to the closest prior art which is commensurate in scope with the claims, but this refers to the closest prior art taught by one of the references, and not to the proposed combination (see MPEP 716.02(c)).

The modification proposed by the Examiner, which is the composition of Haraguchi plus the melamine borate of Hanson, would not represent the "closest prior art," but would represent a possible inventive example. In arguing that there are unexpected results, it is generally possible to provide an **indirect** comparison demonstrating that the modification proposed by the Examiner (i.e., the claimed invention) yields results that are unexpected over the art. (See MPEP 716.02(c)(III) with regard to direct and indirect comparisons). Applicant submits that the data in the present specification adequately demonstrate results commensurate in scope with the present claims, and that the result of an excellent high glass transition temperature is clearly unexpected over the cited art, which indicates effects only in flame retardancy.

In particular, Applicant had previously argued on the basis of Comparative Examples 1, 2 and 4, of the specification, which used ethylenediamine and dicyandiamide, as compared to melamine borate. This was an appropriate indirect comparison, and the results associated with the present invention are unexpected based on the prior art.

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Applicant therefore submits that new claims 18 and 20 are not obvious over Hanson et al. '527 and Haraguchi et al. WO '985, taken separately or in combination.

Regarding new claim 19

The polyamine borate recited in Claim 19 is a compound obtained using the boric acid-based compound (B) represented by the following general formula (1):



wherein n represents an integer of 1 to 3, r represents an alkyl group represented by C_mH_{2m+1} , and m represents an integer of 1 to 10.

Since the above boric acid-based compound (B) of Claim 19 includes an (OR) group, wherein R is an alkyl group, melamine borate is not included in the scope of Claim 19. Since the paragraph [0071] does not suggest any polyamine borates other than melamine borate, there is no suggestion in Hanson or Haraguchi for the limitations of claim 19.

In addition, Applicant has argued above that claim 18, from which claim 19 depends, is not obvious over Hanson and Haraguchi. New claim 19 is therefore not obvious over Hanson et al. '527 and Haraguchi et al. WO '985.

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If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact the applicants' undersigned agent at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed, the applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

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